

May 9, 2022

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**RE: POST-CONSTRUCTION MONITORING FOR LMCPR SUMMARY REPORT BASED ON:
GLOBAL CONSENT DECREE ON COMBINED SEWER OVERFLOWS, EPA NINE MINIMUM
CONTROLS REQUIREMENTS, FINAL WET WEATHER IMPROVEMENT PROGRAM, LOWER MILL
CREEK PARTIAL REMEDY, REVISED ORIGINAL LOWER MILL CREEK PARTIAL REMEDY AND POST-
CONSTRUCTION MONITORING STUDY WORKPLAN AGREEMENTS**

Dear Reviewers:

Per the requirements of Section 10 of the Global Consent Decree on Combined Sewer Overflows, Wastewater Treatment Plants and Implementation of Capacity Assurance Program Plan for Sanitary Sewer Overflows (Global CD) first lodged on December 3, 2003, as entered by the U.S. District Court for Southern District of Ohio Western Division on June 9, 2004, the Final Wet Weather Improvement Program approved in August 2010, the Revised Original Lower Mill Creek Partial Remedy approved on May 30, 2013, and the Post-Construction Monitoring Study Workplan approved on March 20, 2020, the Metropolitan Sewer District of Greater Cincinnati (MSDGC), acting on behalf of the City of Cincinnati and the Board of County Commissioners for Hamilton County, submits the enclosed reports of the hydraulic monitoring and modeling actions performed to evaluate compliance with the performance criteria for the Revised Original LMCPR. ***MSDGC is pleased to report that these actions demonstrate that the goal of significant reduction of combined sewer overflow in the Lower Mill Creek has been achieved.***

In accordance with Section 16.C of the Global CD, I hereby submit the following certification for this submission:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel

properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering such information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

In accordance with paragraph 9 of Section II.A of the approved Post-Construction Monitoring Study Work Plan, these reports have been posted to MSD's website ([MSDGC.org](https://msdgc.org)) concurrent with this transmittal.

Sincerely,

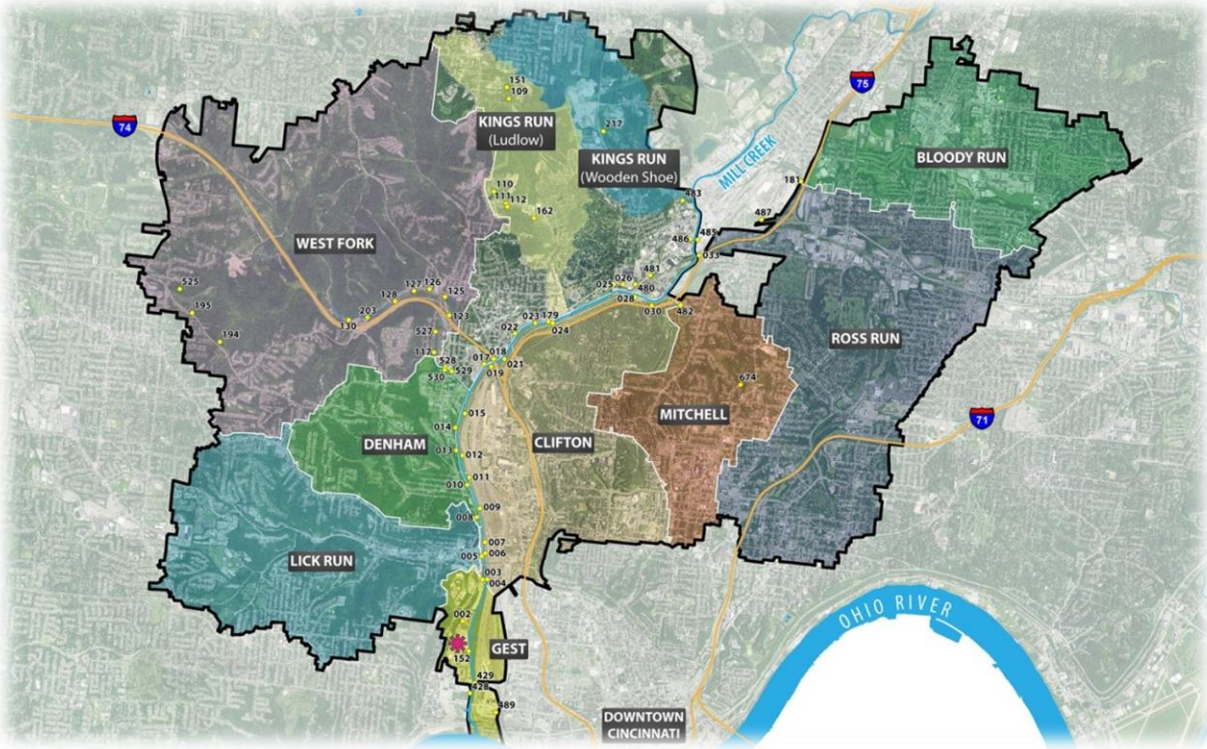


Diana R. Christy, Director
Metropolitan Sewer District of Greater Cincinnati

05/09/2022

Date

c: Allen, Leslie – Chief, Environmental Enforcement Section – US Department of Justice
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Chief, Environmental Enforcement Section – Ohio Attorney General's Office
File



**METROPOLITAN
SEWER DISTRICT**
OF GREATER CINCINNATI

Post Construction Monitoring Report for the Lower Mill Creek Partial Remedy

Prepared for MSDGC by Hazen and Sawyer

Final

50020-022
May 9, 2022

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List of Acronyms

Abbreviation	Definition
CSO	Combined Sewer Overflow
LMCPR	Lower Mill Creek Partial Remedy
MC	Mill Creek
MSDGC	Metropolitan Sewer District of Greater Cincinnati
PCMSWP	Post Construction Monitoring Study Work Plan
RTC	Real Time Control
TY	Typical Year
SSO	Sanitary Sewer Overflow
USEPA	United States Environmental Protection Agency
WWIP	Wet Weather Improvement Program

1. Executive Summary

With the intent of achieving substantial overflow reduction in the Lower Mill Creek early in the wet weather program, the Wet Weather Implementation Program (WWIP), originally approved in 2010, required the construction of a tunnel in the Lower Mill Creek (LMC), along with an Enhanced High-Rate Treatment (EHRT) facility at the Mill Creek Wastewater Treatment Plant (WWTP) and four Real Time Control (RTC) facilities in the Mill Creek collection system. These improvements are shown in Figure 2-1 and constitute the Original Lower Mill Creek Partial Remedy (LMCPR) included in Phase 1. With the prospect of alternative approaches to significant reduction, the WWIP Phase 1 also required a study of the LMCPR to examine green measures or other measures to refine the Original LMCPR approach and cost estimates. Any revisions to the original plan were required to provide equal or greater control of CSO annual volume as the Original LMCPR and be completed by the Phase 1 end date of December 31, 2018.

The LMCPR Study Report was completed in December 2012 and outlined a suite of projects to be included in a Revised Original LMCPR including projects within the Lick Run, Kings Run, West Fork, and Bloody Run watersheds where MSDGC proposed a source control approach to achieve CSO reductions while also utilizing right-sized conveyance and storage solutions. In addition, the Revised Original LMCPR projects included environmental benefits by returning natural drainage to tributaries and streams and improving the water quality of the Mill Creek watershed. The Revised Original LMCPR was approved by the USEPA in May 2013, along with key revisions to the WWIP. Notably, as outlined in Revised Attachment 1C of the WWIP, the Performance Criterion for the Revised Original LMCPR is that the LMCPR projects will reduce annual CSO volume by at least 1.78 billion gallons based on MSDGC's SWMM baseline model (version 3.2), recognized as an equivalent of the 2.01 billion gallons included in the originally approved WWIP. As the LMCPR Study Report detailed in 2012, this reduction was based on using newly available and more up-to-date modeling techniques as well as incorporating revised calibrations based on data collected from 2004-2011 to produce a more accurate model, but still meeting the same percentage of wet weather capture.

Revised WWIP Attachment 1C also required that MSDGC implement a Post-Construction Monitoring Study Work Plan (PCMSWP) utilizing MSDGC's hydrologic and hydraulic model to evaluate compliance with the Revised Performance Criterion. The PCMSWP was approved by the USEPA in March 2020 and required two projections in evaluation of compliance. **Taken together, the two projections demonstrate that the goal of significant overflow reduction in the LMC has been achieved.**

2. Introduction

The following sections summarize the evolution of the Performance Criterion (Original, Revised, and Updated) and present the results from the two projections. These projections required several model versions to be created to represent conditions before and after Phase 1 improvements. Specifically, the projections required the use or development of two pre-Phase 1 models (model versions 3.2 and 3.4) and the development of two post-Phase 1 models (model versions 5.2 and 5.4B). These versions are further described in the subsequent sections. Appendix A includes a mapping of the model versions as they were described in the PCMSWP. Appendix B includes flow charts showing how the model versions required to evaluate compliance relate to one another and depicts how data was incorporated across the various

model versions in their development. Appendix C includes a summary of what is included in each of the model versions.

3. Performance Criterion

The Original LMCPR plan was to construct a tunnel in the LMC, as well as an EHRT at the Mill Creek WWTP and four RTC facilities in the Mill Creek basin, as shown in Figure 3-1. The first component of the Performance Criterion calculation was based on 85% capture of wet weather flow achieved at the “Lower 11” CSOs, depicted in Figure 3-2. The second component of the calculation included the CSO reduction achieved by the three RTC’s upstream of the LMC – Mitchell Ave, Ross Run, and Badgeley Run. Lick Run RTC is included in the required overflow reduction for the Lower 11 CSOs and as such is not included in the second component of the reduction calculation.

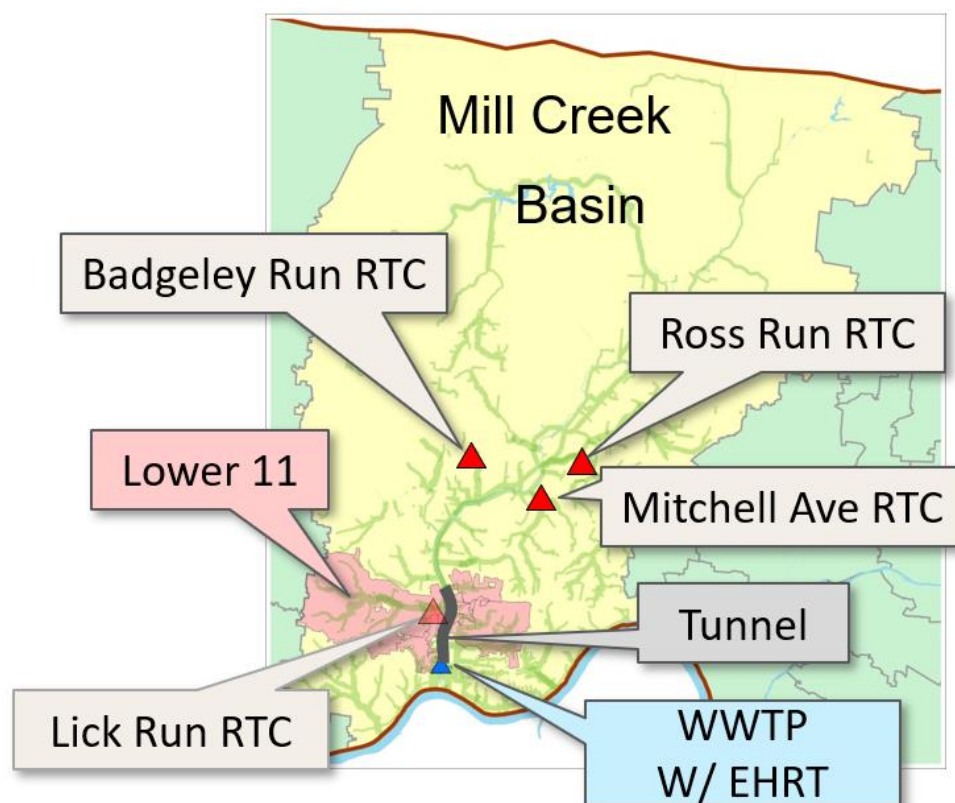


Figure 3-1 – Original LMCPR Phase 1 Projects



Figure 3-2 – Lower 11 CSOs

As noted in the WWIP, any revisions to the original plan were required to provide equal or greater control of CSO annual volume than the Original LMCPR. As the modeling of the basin has been refined, the Performance Criterion target has evolved, too. However, the *approach to calculating* the Performance Criterion continues to be based upon the intent of the Original LMCPR, achieving the same percentage capture as originally intended, just updated to reflect more accurate hydrologic conditions (inflows.) All calculations are based on model runs using MSDGC's Typical Rainfall Year (1970).

3.1 Original LMCPR Performance Criterion

The Original LMCPR Performance Criterion was 2.01 billion gallons, as summarized in Table 3-1. This calculated required reduction was from the 2006 WWIP Volume 13 and the 2006 RTC Study. It was based on MSDGC's original baseline model used from 2004 - 2006. This criterion has been superseded by the Revised Performance Criteria stipulated in the PCMSWP.

Table 3-1 – Original LMCPR Performance Criterion Calculation

CSOs	CSO Reduction Required (Million Gallons)
Lower 11 CSOs	1,603
RTC's Upstream of Lower 11 CSOs	410
Overflow Volume Reduction - Required	2,013

3.2 Revised Original LMCPR Performance Criterion

The first of the two projections required by the PCMSWP to assist in evaluating achievement is based on the SWMM baseline model (version 3.2). Model version 3.2 was created to represent pre-control conditions as of 2007. The Revised Original Lower Mill Creek Partial Remedy Performance Evaluation – Comparing Model Version 5.2 to 3.2 summarizes the projects that were included in this update. This model version also included revised hydrology parameters based on updates through December 2010.

The Revised Performance Criterion for the Revised Original LMCPR equaled 1.78 billion gallons, based on model version 3.2, as summarized in Table 3-2.

Table 3-2 – Revised Original LMCPR Performance Criterion Calculation (Model Version 3.2)

CSOs	CSO Reduction Required (Million Gallons)
Lower 11 CSOs	1,503
RTC's Upstream of Lower 11 CSOs	282
Overflow Volume Reduction - Required	1,785

To assist in evaluating achievement, the LMCPR projects were added to the SWMM 3.2 baseline model to create model version 5.2 (see Appendix B for model version evolution). In addition to the LMCPR projects, additional projects were also included in model version 5.2 that represented other Phase 1 projects completed, critical asset management projects, improvements completed through partnership opportunities, or other projects previously planned and completed. These projects were included as they represent other projects completed by the Phase 1 deadline (December 31, 2018) in the LMCPR project areas and are listed in the Revised Original Lower Mill Creek Partial Remedy Performance Evaluation – Comparing Model Version 5.2 to 3.2.

The modeled overflow reduction achieved from the LMCPR projects from model version 5.2 was calculated by summing the reduction at the locations specified in the PCMSWP (CSOs 5, 125, 126, 127, 128, 181, 217, 482, 483, 485, and 487) from model versions 3.2 to 5.2. Table 3-3 summarizes the modeled overflow reduction achieved from these CSOs which totals 1,668 million gallons. The total

modeled CSO reduction achieved from the Revised Original LMCPR projects is estimated as 117 million gallons less than the 1,785 million gallons of required overflow reduction, as summarized in Table 3-4. This modeled shortfall represents less than 7% of the original overflow target, well within an acceptable range of error for hydraulic models and should be considered successful in light of the three substantive modifications made to LMCPR projects during implementation.

Table 3-3 – Overflow Reduction Achieved – 3.2 vs. 5.2

Watershed	CSO	Version 3.2 Overflow Volume (Million Gallons)	Version 5.2 Overflow Volume (Million Gallons)	Overflow Reduction (Million Gallons)
Lick Run	5	1,475	389	1,086
Kings Run	217	103	2	1
	483	198	43	154
Mitchell	482	216	235	-19
Ross Run	487	435	215	220 ²
Bloody Run	181	606	556	51
West Fork	125	365	212	154 ³
	126	30	28	3
	127	17	1	16
	128	6	3	3
Overflow Volume Reduction - Achieved				1,668

Notes:

- 1) CSO 217 overflow is tributary to CSO 483 influent flow. Therefore, no CSO reduction is shown at 217 as the total reduction is realized at CSO 483.
- 2) Overflow reduction for CSOs 485/487 are combined in Table 5-1 under “487 – Ross Run”.
- 3) Overflow reduction for CSO 125 includes raising West Fork grates.

Table 3-4 – Achieved v. Required Overflow Reduction – 3.2 vs. 5.2

Performance Criteria Evaluation	Overflow Reduction (Million Gallons)
Overflow Reduction Volume – Achieved	1,668
Overflow Reduction Volume - Required	1,785
Difference	-117 (-6.5%)

3.3 Updated Revised Original LMCPR Performance Criterion

The second of the two projections required by the approved PCMSWP to assist in evaluating achievement is based on using the baseline model (version 3.4) developed from the validated SWMM model, as directed by the PCMSWP. Similar to model version 3.2, model version 3.4 represents pre-control conditions as of 2007, but includes the most representative hydrology parameters from the validated SWMM model. In addition to the LMCPR basins, revised hydrology parameters from calibrations outside of LMCPR basins were also included. Creation of model version 3.4 also included updated structures modeling and model updates. The Updated Revised Original Lower Mill Creek Partial Remedy Performance Evaluation – Comparing Model Version 5.4 to 3.4 summarizes the changes that were included in this model update.

The Updated Performance Criterion for the Updated Revised Original LMCPR equaled 1.67 billion gallons, based on model version 3.4, as summarized in Table 3-5.

Table 3-5 – Updated Revised Original LMCPR Performance Criterion Calculation (Model Version 3.4)

CSOs	CSO Reduction Required (Million Gallons)
Lower 11 CSOs	1,014
RTC's Upstream of Lower 11 CSOs	658
Overflow Volume Reduction - Required	1,672

To assist in evaluating achievement, the calibrated SWMM model was utilized which included the LMCPR projects, as directed by the PCMSWP, with inputs converted to the typical year to create model version 5.4B (see Appendix B for model version evolution). In addition, this version included the removal of the bridge projects. These projects represent additional projects constructed after Phase 1 and thus were removed to adequately assess the benefit of Phase 1 projects only. These changes are listed in the Updated Revised Original Lower Mill Creek Partial Remedy Performance Evaluation – Comparing Model Version 5.4 to 3.4.

Similar to the first projection, the overflow reduction achieved from the LMCPR projects from model version 5.4B was calculated by summing the reduction at the locations specified in the PCMSWP (CSOs 5, 125, 126, 127, 128, 181, 217, 482, 483, 485, and 487), but from model versions 3.4 to 5.4B for the second projection. Table 3-6 summarizes the modeled overflow reduction achieved from these CSOs which totals 1,919 million gallons. The total modeled CSO reduction achieved from the Revised Original LMCPR projects exceeds the 1,672 million gallons of modeled overflow reduction required, as summarized in Table 2-7, by 247 million gallons. Therefore, the Phase 1 LMCPR projects met and exceeded the required reduction.

Table 3-6 – Overflow Reduction Achieved – 3.4 vs. 5.4B

Sub-basin	CSO	Version 3.4 Overflow Volume (Million Gallons)	Version 5.4B Overflow Volume (Million Gallons)	Overflow Reduction (Million Gallons)
Lick Run	5	939	76	863
Kings Run	217	53	1	- ¹
	483	173	16	155
Mitchell	482	193	219	-27
Ross Run	487	844	262	583 ²
Bloody Run	181	489	387	102
West Fork	125	485	266	219 ³
	126	42	35	7
	127	13	1	12
	128	6	2	4
Overflow Reduction Volume - Achieved				1,919

Notes:

- 1) CSO 217 overflow is tributary to CSO 483 influent flow. Therefore, no CSO reduction is shown at 217 as the total reduction is realized at CSO 483.
- 2) Overflow reduction for CSOs 485/487 are combined in Table 5-1 under “487 – Ross Run”.
- 3) Overflow reduction for CSO 125 includes raising West Fork grates.

Table 3-7 – Achieved v. Required Overflow Reduction – 3.4 vs. 5.4B

Performance Criteria Evaluation	Overflow Reduction (Million Gallons)
Overflow Reduction Volume - Achieved	1,919
Overflow Reduction Volume - Required	1,672
Difference	+247 (+14.8%)

4. Model Calibration

The approved PCMSWP required the following monitoring and modeling actions:

- Collect sufficient flow, rainfall and overflow activation monitoring data for a period of 12 months following completion of construction of the Revised Original LMCPR, to validate or recalibrate the SWMM collection system model.

- QA/QC data collected and run a continuous simulation using the SWMM collection system model to compare against collected data to determine model validation and whether recalibration of the SWMM collection system model is needed.
- If needed, perform re-calibration of the SWMM collection system model until there is sufficient agreement between the model and the observed flows and CSO monitoring data for the post-construction monitoring period.

MSDGC collected post-construction data for an 18-month monitoring period from January 2020 through July 2021 at the locations shown in Figure 4-1, based upon the approved six-month extension to include monitoring in the Spring of 2021 when the green infrastructure was more fully established. These locations are referred to as the core LMCPR flow monitors. As summarized in Lower Mill Creek Partial Remedy Post Construction Model 5.4E Evaluation, model version 5.4E was constructed to include the latest representation of the LMCPR projects and model output was compared against the core LMCPR post-construction data. As summarized in the in Lower Mill Creek Partial Remedy Post Construction Model 5.4E Evaluation, MSDGC determined that recalibration was required to properly characterize the post-construction conditions associated with the LMCPR improvements. With this result, MSDGC undertook an extensive effort to recalibrate the 5.4E model. The calibration revisions and associated results are documented in the Model Calibration Report for the Lower Mill Creek Partial Remedy. As summarized in that report, this effort resulted in a well-calibrated model that adequately characterizes post-construction conditions associated with the 12-month monitoring period from July 2020 through July 2021.

Concurrent with core LMCPR flow monitoring, MSDGC monitored basins beyond the LMCPR limits in areas referred to as the expanded LMCPR flow monitor locations, shown in Figure 4-2. The calibration results from these monitors are summarized in a separate report. Model revisions associated with the calibration of the expanded LMCPR flow monitors were included in the final model version 5.4C, as shown in Appendix B.

Figure 4-1 – Core LM CPR Flow Monitoring Locations

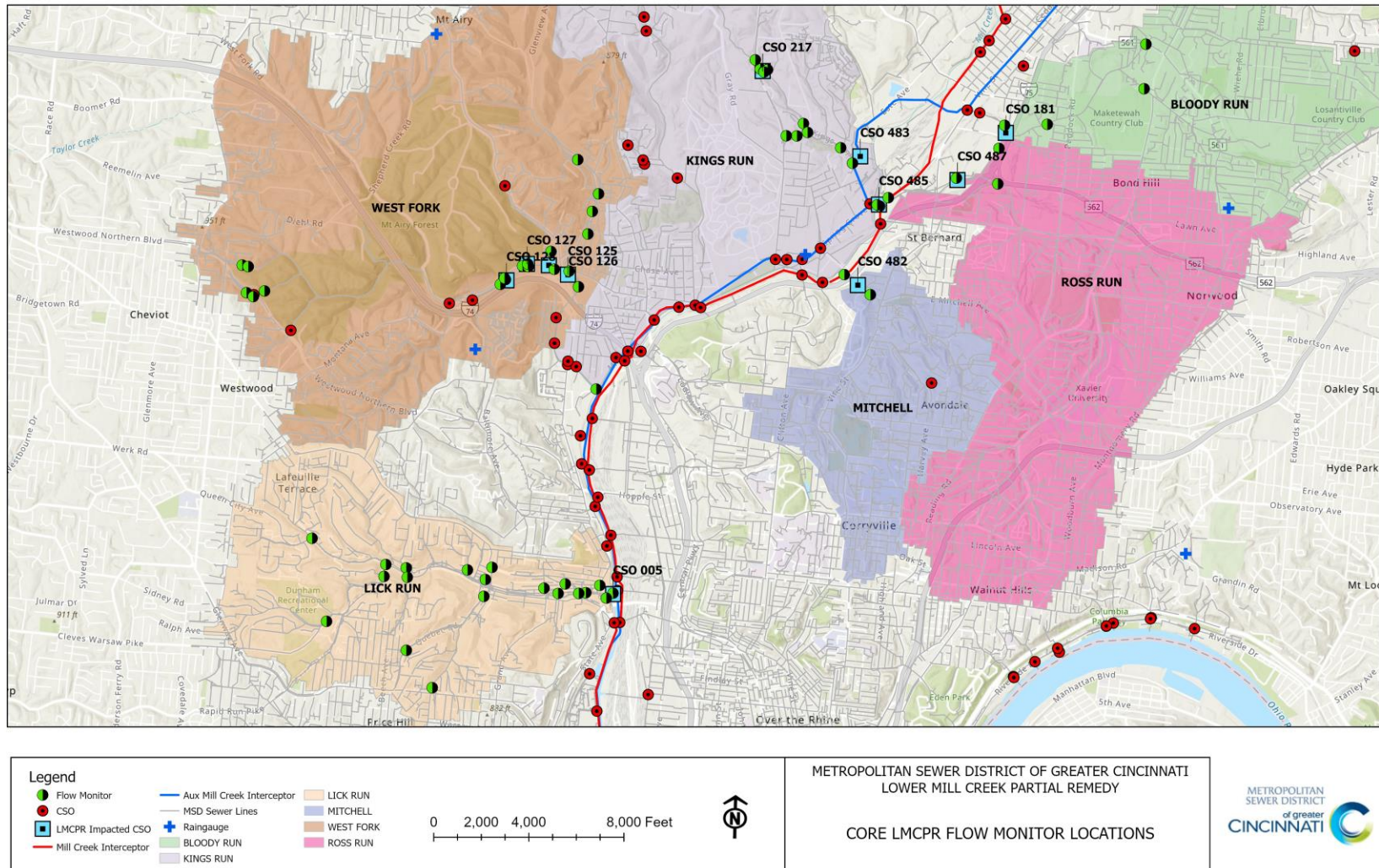
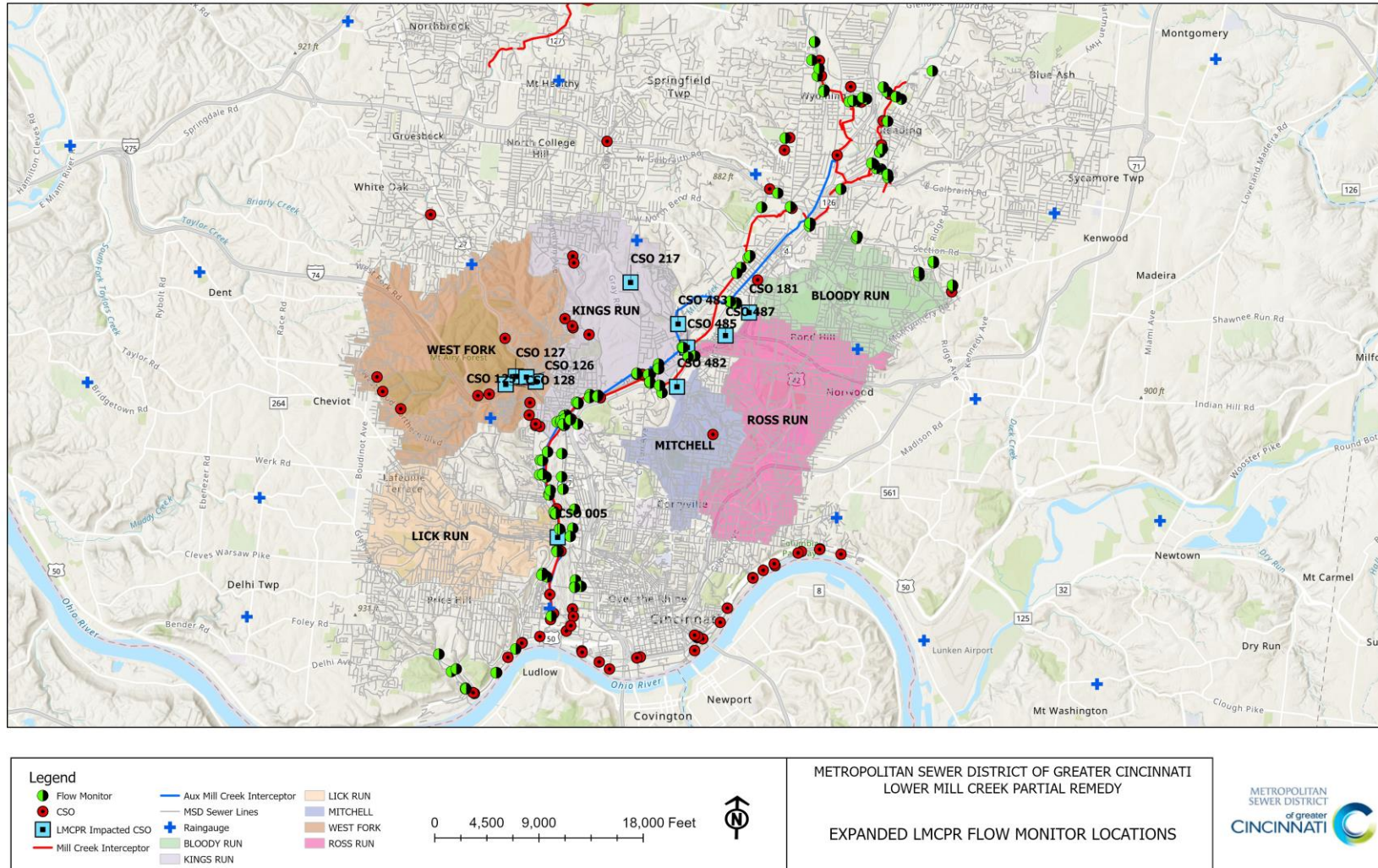


Figure 4-2 – Expanded LMCPR Flow Monitoring Locations



5. Assessing Green Infrastructure Impact

MSDGC was granted a six-month extension to the monitoring period for the LMCPR to include monitoring in Spring 2021 that reflects establishment of green infrastructure, as provided for in the PCMSWP (Section II.A.2.b). As part of that granted extension, upon completion of model calibration as described in Section 4.0, and typical year performance evaluation as described in Section 3.0, the following expanded evaluation would also be included:

- Run the actual rainfall from 1/2020-7/2020 (“Spring 2020,” reflecting conditions before Green Infrastructure establishment) through the model and “project the number and volume of CSOs” from the LMCPR projects;
- Run the actual rainfall from 1/2021-7/2021 (“Spring 2021,” reflecting conditions after Green Infrastructure had an entire year to become established) through the same model and get the same measures of performance; and
- Compare the modeled results for Spring 2020 with the CSO monitoring results for Spring 2020.

Tables 5-1 and 5-2 below includes a comparison of modeled results for both Spring 2020 and 2021 versus the CSO monitoring results for Spring 2020 and 2021 for CSO 5 in Lick Run. (This was the only watershed with substantial establishment of green infrastructure from Spring 2020 to Spring 2021.) While there is little difference between data from 2020 to 2021, there is a noticeable difference between modeled and monitored data within each year. However, it is fully expected that monitored overflows exceed modeled overflows due to underflow clogging, gate jamming and other unavoidable operational issues. This location is particularly notorious for maintenance challenges. A review of the maintenance records for this CSO during the 18-month monitoring period (January 1, 2020 through July 30, 2021) identified 351 site visits of which 313 included cleaning.

Table 5-1 – Spring 2020 & Spring 2021 CSO Model Results

Watershed	CSO	Spring 2020 Model Results		Spring 2021 Model Results	
		Activations	Volume (Million Gallons)	Activations	Volume (Million Gallons)
Lick Run	5	6	63	7	86

Table 5-2 – Spring 2020 & Spring 2021 CSO Monitoring Results

Watershed	CSO	Spring 2020 Monitoring Results		Spring 2021 Monitoring Results	
		Activations	Volume (Million Gallons)	Activations	Volume (Million Gallons)
Lick Run	5	15	272	14	313

6. Conclusion

The two required projections for evaluation of compliance as required by the approved PCMSWP affirm that the Phase 1 LMCPR projects successfully achieved the significant overflow reduction goals. For the Revised Original LMCPR Performance Criterion, the CSO reduction achieved was 117 million gallons less than the overflow reduction required. As stated previously, this shortfall represents less than 7% of the original overflow target, which is well within the acceptable range of error for hydraulic models and should be considered successful in light of the three substantive modifications made to LMCPR projects during implementation. For the Updated Revised Original LMCPR Performance Criterion, the CSO reduction achieved was 247 million gallons greater than the overflow reduction required. This Criterion is based on the latest validated SWMM model and indicates the LMCPR projects met and exceeded the required reduction.

References

Final Wet Weather Improvement Program. Metropolitan Sewer District of Greater Cincinnati. June 2009.

Lower Mill Creek Partial Remedy Post Construction Model 5.4E Evaluation. Metropolitan Sewer District of Greater Cincinnati. August 13, 2021.

Lower Mill Creek Partial Remedy (LMCPR) Study Report. Metropolitan Sewer District of Greater Cincinnati. December 18, 2012.

Model Calibration Report for the Lower Mill Creek Partial Remedy. Metropolitan Sewer District of Greater Cincinnati. May 6, 2022.

Post Construction Monitoring Work Plan. Metropolitan Sewer District of Greater Cincinnati. March 6, 2020.

Revised Original Lower Mill Creek Partial Remedy Performance Evaluation – Comparing Model Version 5.2 to 3.2. Metropolitan Sewer District of Greater Cincinnati. May 2, 2022.

Revised Original Lower Mill Creek Partial Remedy Approval Letter. United States Environmental Protection Agency. May 30, 2013.

Updated Revised Original Lower Mill Creek Partial Remedy Performance Evaluation – Comparing Model Version 5.4 to 3.4. Metropolitan Sewer District of Greater Cincinnati. May 2, 2022.

Appendix A – PCMSWP Mapping to Model Versions

Post-Construction Monitoring Study Work Plan (Final Version Approved by Regulators on 03/20/20, Pgs 7-8)

8. To assist in evaluating achievement of the Performance Criterion for the Revised Original LMCPR, Defendants will:

- a. Make two projections (one using the validated SWM and the other using SWMM baseline Model Version 3.2) of the CSO volumes that would have been discharged from CSOs 005, 125, 127, 128, 181, 217A, 482, 483, 487 with Defendants collection system configuration as of July 2003 during MSDGC's Typical Rainfall Year (1970), which configuration will include the Capital Improvement Projects and highly active SSO projects identified in Tables 4.2 and 4.3 in MSDGC's 2006 "Wet Weather Improvement Program; Volume II, CSO Long Term Control Plan Update Report," Section 4.7 pages 4-14 and 4-15 included; and
- b. Make two projections (one using the validated SWM and the other using SWMM baseline Model Version 3.2) of the CSO volumes discharged from those same outfalls with Defendants' collection system configuration following implementation of the Revised Original LMCPR during MSDGC's Typical Rainfall Year (1970).

8. To assist in evaluating achievement of the Performance Criterion for the Revised Original LMCPR, Defendants will:

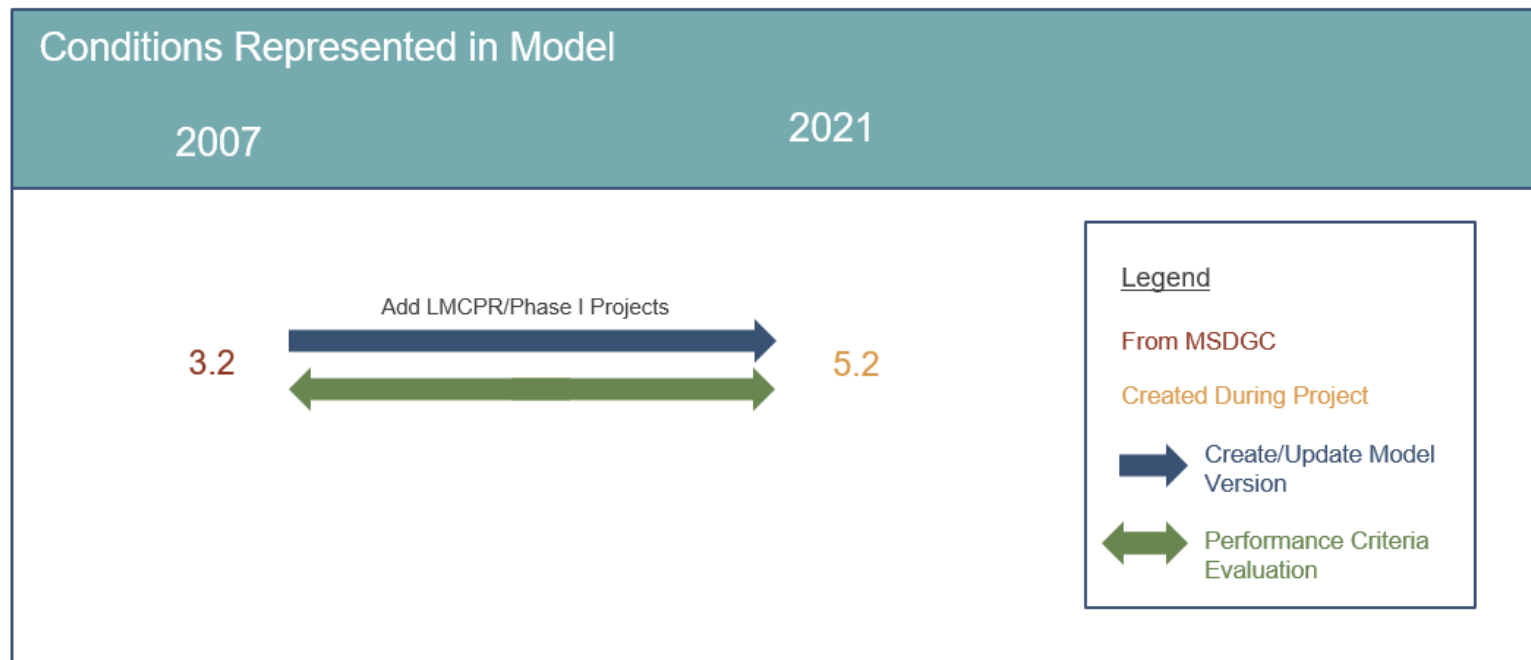
- a. Make two projections (one using Version 3.4 SWM and the other using SWMM baseline Version 3.2 on 3.2) of the CSO volumes that would have been discharged from CSOs 005, 125, 127, 128, 181, 217A, Defendants collection system configuration as of July 2003 during MSDGC's Typical Rainfall Year (1970), which configuration will include the Capital Improvement Projects and highly active SSO projects identified in Tables 4.2 and 4.3 in MSDGC's 2006 "Wet Weather Improvement Program; Volume II, CSO Long Term Control Plan Update Report," Section 4.7 pages 4-14 and 4-15 included; and
- b. Make two projections (one using Version 5.4B SWM and the other using SWMM baseline Version 5.2 on 3.2) of the CSO volumes discharged from those same outfalls with Defendants' collection system configuration following implementation of the Revised Original LMCPR during MSDGC's Typical Rainfall Year (1970).

Comparison 1
"Using SWMM
Baseline Model
Version 3.2"
1.78 BG

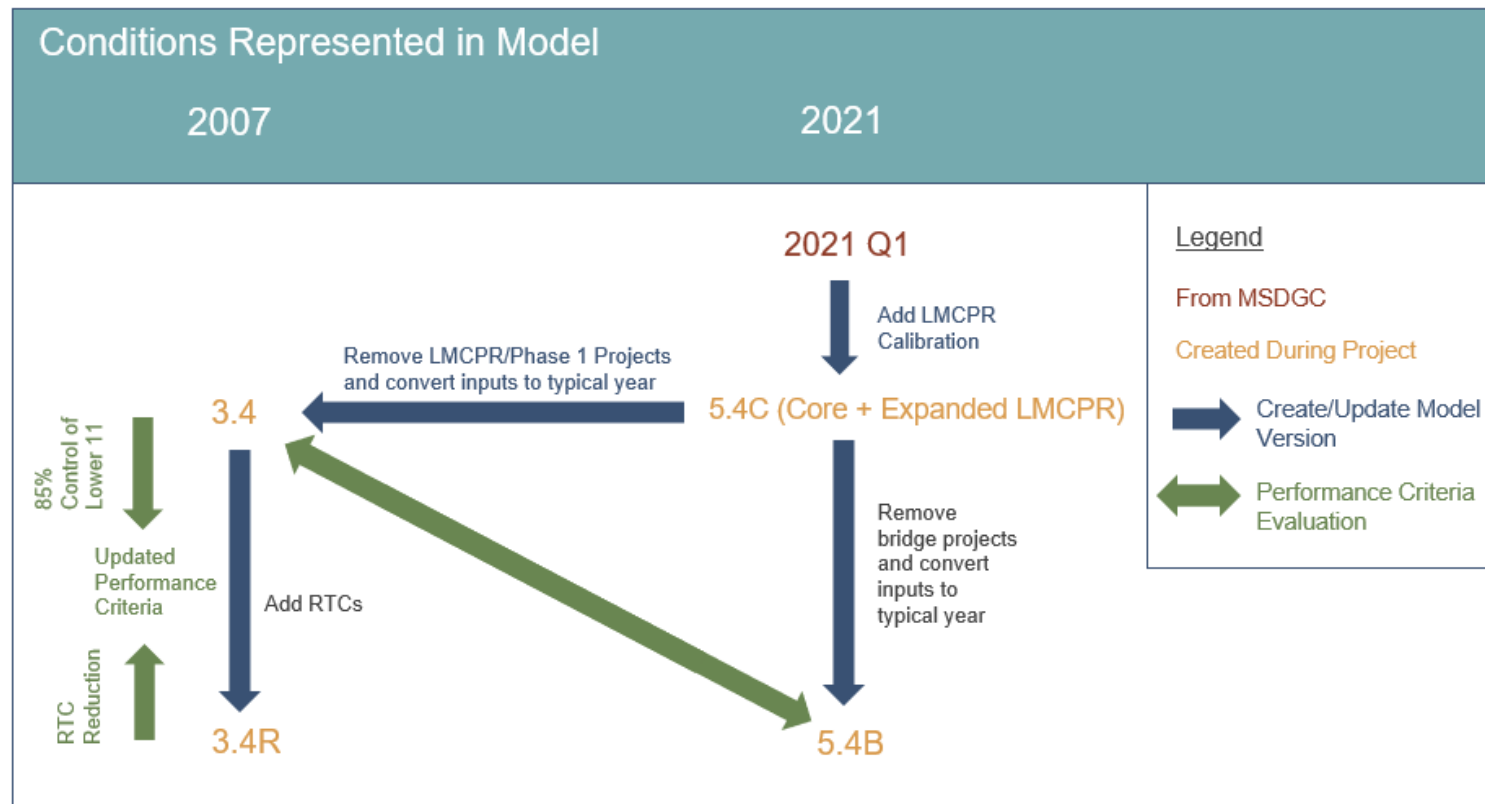
Comparison 2
"Validated
SWMM"
1.66 BG

Appendix B – Model Version Summary

3.2/5.2 Model Version Flow Chart



3.4/5.4 Model Version Flow Chart



Model Version 3.2 – (MC_Version32_050412) Baseline model version that represents the pre-control conditions with system configuration as of 2007.

2021 Q1 – (MC_Exist2021Q1_TY) Represents the existing conditions model as of 2021 Q1.

Model Version 5.2 – Update model version 3.2 with the latest information available for the LMCPR projects and other completed WWIP Phase 1 projects.

Model Version 5.4C – Calibration of model version 5.4E based on flow data collected as part of the LMCPR monitoring effort.

Model Version 5.4B – Remove bridge projects from post-calibration model version 5.4C and convert model inputs to the typical year.

Model Version 3.4 – Update model version 3.3 with revised hydrology from calibration and include updated structures modeling and model updates.

Model Version 3.4R – Update model version 3.4 to include the Lick Run, Mitchell Ave, Ross Run, and Badgeley Run RTCs.

Appendix C – Model Version Changes Included

Description	Item	Model Version			
		Revised Original		Updated	
		3.2	5.2	3.4	5.4B
HASSO and CIP Projects	HASSO and CIP Projects in June 2006 Wet Weather Improvement Program	X	X	X	X
LMCPR Phase 1 Projects	Lick Run Interceptor Chamber RTC		X		X
	Lick Run Property Demolitions		X		X
	Lick Run Valley Conveyance System (VCS)		X		X
	Queen City Avenue Sewer Separation Phase 2		X		X
	Queen City & Cora Avenues Right of Way Sewer Separation		X		X
	Quebec Road Sewer Separation		X		X
	Harrison Avenue Sewer Separation Phase A		X		X
	Harrison Avenue Sewer Separation Phase B		X		X
	Queen City Avenue Sewer Separation Phase 1		X		X
	Quebec Heights Sewer Separation		X		X
	Rapid Run Park Source Control		X		X
	Sunset Avenue, Sunset Lane, and Rapid Run Pike Sewer Separation		X		X
	White Street Sewer Separation		X		X
	Wyoming and Minion Avenues Sewer Separation		X		X
	CSO 125 Stream Separation		X		X
	CSO 125 Stream Separation Phase B		X		X
	CSO 125 Stream Separation Phase C		X		X
	CSO 125 Badgeley Run RTC		X		X
	CSO 127 and 128 Stream Separations		X		X
	CSO 194 High Point Sewer Separation		X		X
	CSO 195 Westwood Northern Grating Sewer Separation		X		X
	CSO 525 Part I - Mt. Airy Grating Sewer Separation		X		X
	CSO 217/483 Source Control Phase A (Basins)		X		X
	CSO 217/483 Source Control Phase A (Stream Separation)		X		X
	CSO 217/483 Source Control Phase A2 (Separation)		X		X
	CSO 217/483 Source Control Phase A3 (Separation)		X		X
	CSO 217/483 Source Control Phase B (Tank)		X		X
	CSO 217/483 Source Control Phase C		X		X
	CSO 482 – Mitchell Avenue RTC		X		X
	Ross Run RTC		X		X
	Ross Run Storm Sewer Separation		X		X
	CSO 181 RTC		X		X
Other Phase 1 Projects in Lower Mill Creek	Westwood Northern Bundle		X		X
	Mt. Airy Sewer Replacement		X		X
	Mt. Airy Receiving Sewer Upgrade		X		X
	ODOT I-75 Projects		X		X
	Grating Changes to CSO 191 and CSO 111		X		X
	West Fork Channel Gate Modifications		X		X
	Cleaning of Mill Creek Interceptor		X		X
	CSO 37 Maple St. Diversion Dam Improvements		X		X
	CSO 39 64th St. Diversion Dam Improvements		X		X
	Spring Grove Ave and Clifton Ave Sewer Separation (CSO 25)		X		X
	Ludlow Run (CSO 179)		X		X
	Daly Road to Compton Road Sewer Improvements		X		X
	CSO 179 Scarlett Oaks Sewer Separation		X		X
	CSO 525 Mt. Airy Grating Sewer Separation, Contract 1 only		X		X
	Cincinnati State Detention System		X	Phase 1 only	X
	Cincinnati Zoo Sewer Separation		X		X
Model Calibrations	LMCPR Calibration to Core LMCPR Flow Monitors			X	X
	LMCPR Calibration to Expanded LMCPR Flow Monitors			X	X
	Updated Calibrations from 2014 - 2021			X	X
Other Completed Projects/Updates	SSO 1066 Elimination			X	X
	Updated CSO Structures Modeling			X	X
	Mill Creek Interceptor Creek Crossing (Spring Grove)			X	X
	Three Mill Creek and Auxiliary Mill Creek Interceptor Crossovers				X
	Updated SSO 700 RTC Operation				X
	Winton 1&2 and Sherwood PS Consolidation				X
	Mill Creek Interceptors Diversion Chambers				X
	Cleneay Avenue & Harold Avenue Sewer Replacement Improvements				X
	Blair Avenue Sewer Replacement			X	X
	Admore Avenue Sewer Replacement				X
	Macauley Street Sewer Replacement				X
	Citylink Center Development				X
	Village of Daybreak Phase V and VI				X
	CSO Regulator Removal (CSOs 6, 7, and 9)				X
	Constructed CSO Weir Raisings				X
	CSO 666 Dam Raising				X
Bridge Projects	Lining of Mill Creek Interceptor				
	Addition of 4th Tank at SSO 700				
	Improvements at CSO 513/514				